Northern Goshawk (*Accipiter gentilis*) Species Guidance

Family: Accipitridae – the hawks, kites, and eagles

Species of Greatest Conservation Need (SGCN)

State Status: SC/M (Special Concern/Migratory Bird Protection)

State Rank: S2B, S2N

Federal Status: None

Global Rank: G5

Wildlife Action Plan Mean Risk Score: 3.0

Wildlife Action Plan Area of Importance Score: 2

Counties with documented locations of Northern Goshawk breeding or breeding evidence in Wisconsin. Source: Natural Heritage Inventory Database, July 2012.

Michele Woodford, Wisconsin DNR

Species Information

General Description: Northern Goshawks are the largest member of the accipiter genus in Wisconsin. They possess a long tail and short, rounded wings (Bosakowski 1999), and they combine the size of a large long-tailed hawk with the quick wing beats of an accipiter hawk (Sauer et al. 2008). Wingspans range from 102-117 cm (40-46 in) and total body length from 53-66 cm (21-26 in); males are usually smaller than females (National Geographic Society 1999). Plumage consists of a bluish-gray back, pale-gray to white streaked underparts, fluffy white undertail coverts, and a solid black cap on the head with a prominent white eye stripe above red eyes (Bosakowski 1999). Northern Goshawks attain their complete adult plumage at two years. Juveniles have a mottled brown back, heavily streaked brown and white under-parts, and a brown-streaked head with a less conspicuous white eye stripe than adults. Eye color of fledglings is initially a pale greenish-gray, but gradually turns pale yellow (Bosakowski 1999).

Definitive Identification: Adult Northern Goshawks are unmistakable when seen well. Their bodies are grayish-blue above and mottled white underneath, with a distinctive broad white stripe above red eyes. The Northern Goshawk's territorial call (i.e., kak, kak, kak, kak) is also diagnostic. An example of a typical Northern Goshawk territorial call can be heard here: <http://www.allaboutbirds.org/guide/Northern_Goshawk/id>

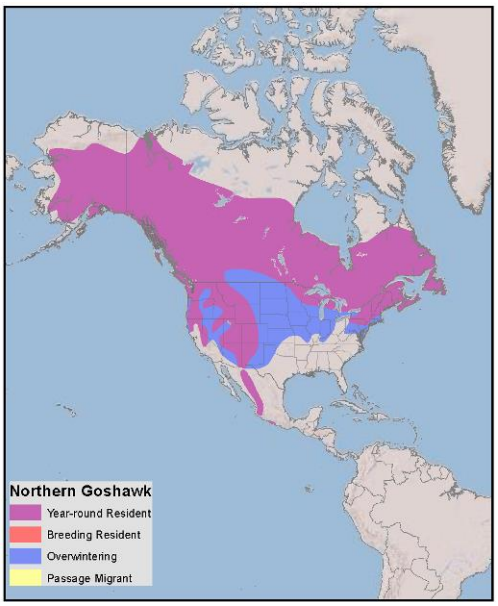
Similar Species: At a distance, adult and juvenile Northern Goshawks can be confused with the other two accipiter species found in Wisconsin, the Cooper's Hawk (*Accipiter cooperii*) and Sharp-shinned Hawk (*Accipiter striatus*). Northern Goshawks are similar in shape and patterning to immature Cooper's Hawks, but are much larger, with proportionately shorter tails, bulkier bodies, and thicker black streaking that extends to the undertail coverts. Sharp-shinned Hawks are also much smaller than Northern Goshawks, and have a shorter, squared-off tail and smaller head.

Juvenile Northern Goshawks could be confused with Gyrfalcons (*Falco rusticolus*) and Red-shouldered Hawks (*Buteo lineatus*; National Geographic Society 1999). However, observations of Gyrfalcons are extremely rare in Wisconsin and Red-shouldered Hawks have more rounded wings, pale crescents in the wing, and a shorter tail with distinctive tail bands (Sauer et al. 2008).

Associated Species: Red-shouldered Hawks, Barred Owl (*Strix varia*), and Pileated Woodpecker (*Dryocopus pileatus*).

State Distribution and Abundance: Northern Goshawks are low-density breeders in Wisconsin, and the Great-Lakes region is the southern boundary of their breeding range (Woodford et al. 2008). Nesting records have been reported for all counties in northern Wisconsin except for Barron and Polk (WDNR, unpublished data). In the central part of the state, verified nesting records occur for Clark, Jackson, Portage, Waushara, Marquette, Monroe, Wood, Juneau, Door, and Sheboygan counties (WDNR, unpublished data). In 2008, surveys to determine areas occupied by territorial Northern Goshawks during the breeding season reported 903 ± 445 occupied sampling units in the area surveyed within Wisconsin (Bruggeman et al. 2009, Bruggeman et al. 2011).

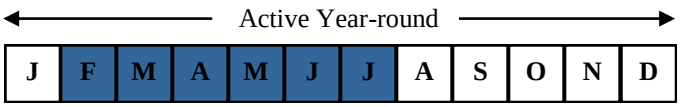
Global Distribution and Abundance: Northern Goshawks have a holarctic distribution and inhabit the northern temperate and boreal forests of North America, Europe, and Asia (Squires and Reynolds 1997). In North America, they breed in coniferous, deciduous, and mixed forest of Alaska, Canada, and the western upper Midwest, and northeast United States (Reynolds et al. 1992).



New World range map for Northern Goshawk. (NatureServe 2013)

Diet: Northern Goshawks are prey generalists across much of their breeding range (Squires and Reynolds 1997). A study of prey remains collected in or near nests in Wisconsin identified a variety of avian and mammalian species. Ruffed Grouse (*Bonasa umbellus*), Blue Jay (*Cyanocitta cristata*), red squirrel (*Tamiasciurus hudsonicus*), American Crow (*Corvus brachyrhynchos*) and eastern chipmunk (*Tamias striatus*) were the most common prey species found (Woodford et al. 2008).

Reproductive Cycle: Most Northern Goshawks that nest in Wisconsin are year-round residents. Those that migrate return to nesting territories by late February to early April (Squires and Reynolds 1997). Nest building and courtship can begin up to two months prior to egg laying (Johnsgard 1990). Bosakowski (1999) estimated that 80% of incubation begins during the second through fourth weeks of April. Eggs were laid from March 20 to April 26 in Wisconsin (J. Woodford, unpublished data). A clutch of two to four eggs is incubated primarily by the female for 28 to 38 days, and renests are uncommon (Squires and Reynolds 1997). Females do most of the brooding and feeding while the male provides the food to nestlings and the female (Squires and Reynolds 1997). At 34 to 37 days old the nestlings can begin "branching" on perches near the nest (Bosakowski 1999). Male nestlings generally fledge at 35 to 36 days, and females fledge at 40 to 42 days. Young depend on parents for food up to six weeks after fledging (Bosakowski 1999). Speiser and Bosakowski (1991) reported breeding females with immature plumage, but immature males were not observed breeding (Henny et al. 1985). Adults defend their nests very aggressively with calls, close fly-bys, and even aerial attacks (Speiser and Bosakowski 1991). In Wisconsin, Woodford et al. (2008) reported annual Northern Goshawk productivity and nest success ranging from 0.93-1.79 young per active nest and 43-87%, respectively.



Avoidance Period

Ecology: Northern Goshawks are an uncommon resident in northern Wisconsin and a rare winter resident in central and southern Wisconsin (Robbins 1991). They have been reported as a common fall migrant every eight to 10 years when their primary prey in Canada, the snowshoe hare (*Lepus americanus*), experiences a significant population decline (Mueller et al. 1997).

Nests

Nesting areas may contain one to five alternate nest trees, which are located in relatively small forest stands, ranging from one to 250 acres in size (Reynolds et al. 1982, Speiser and Bosakowski 1991, Squires and Ruggiero 1996). Nest trees are usually the largest available within the stand (Bent 1937, Bosakowski 1999). Nests are normally built in the main fork of deciduous trees and along the trunk or at an injury of coniferous trees. New nests are typically 46-61cm (18-24 in) wide and 25-31cm (10-12 in) deep (J. Woodford, unpublished data), but refurbished ones can be significantly larger. The most commonly used tree species for Northern Goshawk nests in Wisconsin, in descending order, are yellow birch (*Betula alleghaniensis*), aspen (*Populus* sp), sugar maple (*Acer saccharum*), and white birch (*Betula papyrifera*; Woodford et al. 2008).


Sites with active Northern Goshawk nests in northern Wisconsin. Left and right photos by Jim Woodford, Wisconsin DNR and middle photo by W.A. Smith, Wisconsin DNR.

Eggs
A Northern Goshawk clutch is two to four unmarked, bluish eggs averaging 59 x 45 mm (2.3 x 1.8 in; Bent 1937). Eggs are laid at two to three day intervals, but initial incubation is likely less intense than incubation after all eggs have been laid because the entire clutch usually hatches during a two to three day period (Johnsgard 1990).

Natural Community Associations (WDNR 2005, WDNR 2009):
Significant: northern mesic forest
Moderate: boreal forest, northern dry-mesic forest, white pine-red maple swamp
Minimal: none

Habitat: Northern Goshawk habitat use follows three distinct spatial scales: (1) nest area, (2) post-fledging area, and (3) foraging area (reviewed in Squires and Kennedy 2006). Canopy coverage is typically high in Northern Goshawk nest areas, but may range from 94% to 51% depending on local forest conditions (Bosakowski 1999). Deciduous trees are usually favored for nest building in mixed forests (Zirrer 1947, Bosakowski 1999), because they provide a more stable structure to support the nest and have larger-diameter limbs than conifers species of similar trunk diameter (Bosakowski 1999). However, almost all Northern Goshawk nests in the western United States occur in conifers (Reynolds et al. 1982, Squires and Ruggiero 1996). In Wisconsin, Rosenfield et al. (1998) reported that 78% of nests were built in deciduous trees with a mean diameter of 41.0 cm (range = 36.4-45.2), mean canopy height of 25.0 m (range = 23.6-25.6) and a mean tree density of 171.2 trees/acre (range = 138.0-204.3). Woodford et al. (2003) report the mean nesting and basal area for Northern Goshawk nest areas were 76.6 acres (range = 14.8-249.5) and 10 m^2/acre (range = 6.9-14.6), respectively. Shrub cover is often reduced in nesting areas in mature eastern forests, producing an open park-like stand (Bosakowski 1999). Habitat modeling predicts that 7.6% of the northern highland landscape of Wisconsin has > 50% probability of being occupied by breeding Northern Goshawks (Woodford et al. 2003). Very little information is available for the post-fledging and foraging-area habitat scales in Wisconsin.

Threats: In general, threats to breeding Northern Goshawks in Wisconsin are related to habitat degradation, increased abundance of predators, and taking of young from nests by falconers (Squires and Reynolds 1997, Erdman et al. 1998). Forest managers that closely follow DNR's Northern Goshawk *Avoidance Measures* have been very successful at retaining breeding pairs in nesting areas while forest management activities (e.g., timber harvest, road building) proceed nearby.

Climate Change Impacts: The predicted loss or significant decline of northern hardwood, spruce-fir, hemlock, and aspen forest types (WICCI 2011, Swanston et al. 2011) may negatively impact both Northern Goshawk nesting area and prey distributions within Wisconsin**.** This loss of preferred forest habitats and the prey associated with them could potentially shift Northern Goshawk distribution northward within Wisconsin.

Survey Guidelines: If surveys are being conducted for regulatory purposes, survey protocols and surveyor qualifications must first be approved by the Endangered Resources Review Program (see *Contact Information*). Follow methods and definitions provided by Woodford et al. (2008) to monitor Northern Goshawk nesting areas and territories. Follow the USFS Northern Goshawk Monitoring protocol (Woodbridge and Hargis 2006), or a similar design, for larger-project area surveys and regional surveys. Both protocols use broadcast surveys of conspecific calls during one or more periods of the breeding cycle to search for occupied nesting areas and territorial birds.

Summarize results, including survey dates, times, weather conditions, number of detections, detection locations, and behavioral data and submit via the WDNR online report: <http://dnr.wi.gov, keyword "rare animal field report form">.

Management Guidelines

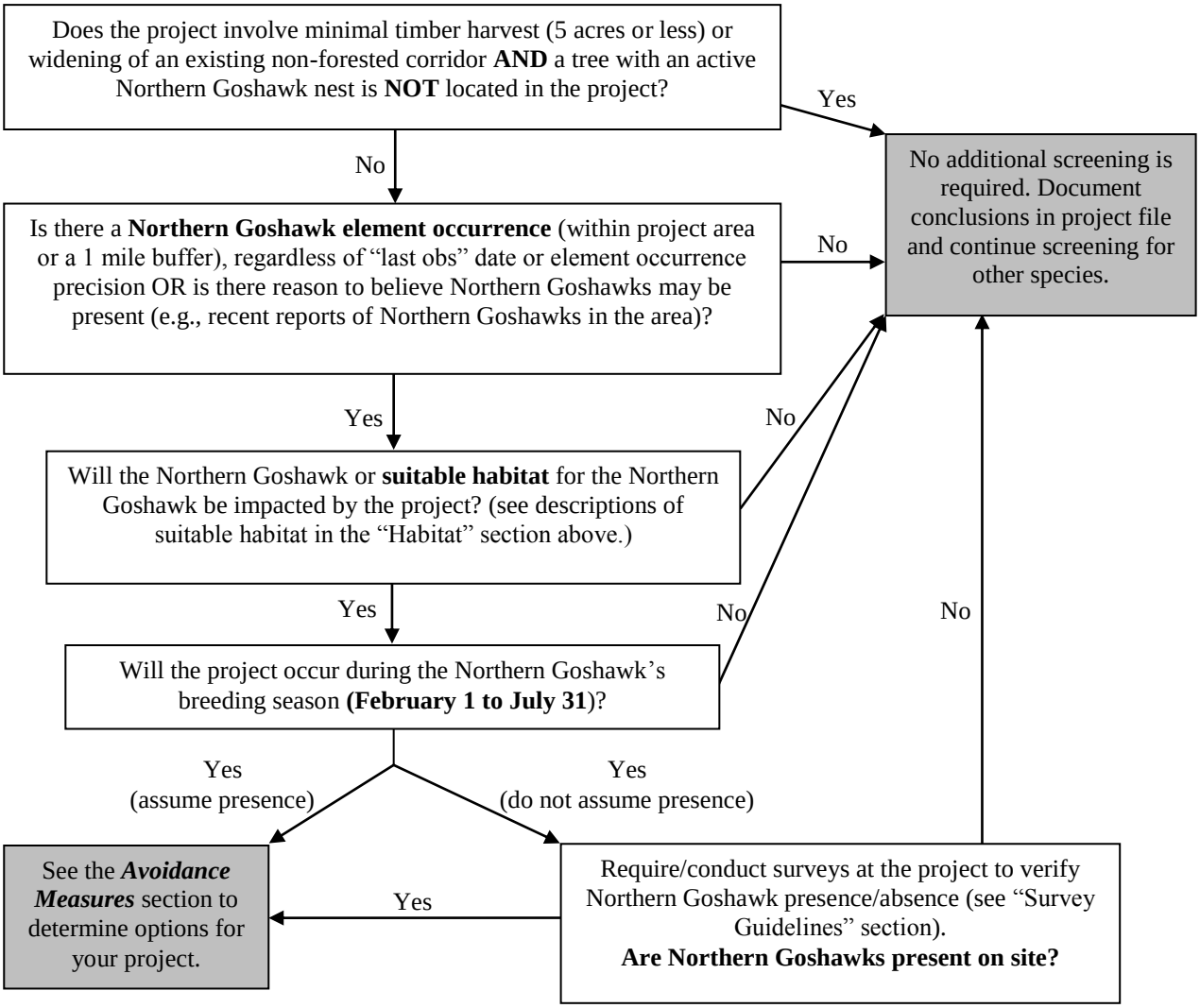
The following guidelines typically describe actions that will help maintain or enhance habitat for the species. These actions are not mandatory unless required by a permit, authorization or approval.

Practices that benefit Northern Goshawks maintain moderate to high levels of canopy closure, preserve large trees (> 15 inches DBH) to support stick nests, and conserve large contiguous blocks of hardwoods, mixed, and coniferous forest stands. Known or potential nesting area stands should retain 70% or more of basal area, post-harvest, to remain as suitable habitat. Timber sales within suitable habitat should strive to retain existing tree and shrub species diversity in forest stands, or promote increased diversity, to increase Northern Goshawk occupancy. Generally, uneven-aged management practices and increased heterogeneity of forest types across large blocks of forests improve conditions for Northern Goshawks.

Screening Procedures

The following procedures should be followed by DNR staff reviewing proposed projects for potential impacts to the species.

Follow the "Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff" document (summarized below) to determine if Northern Goshawks will be impacted by a project (WDNR 2012):



Avoidance Measures

The following measures are specific actions required by DNR to avoid take (mortality) of state threatened or endangered species per Wisconsin's Endangered Species law (s. 29.604, Wis. Stats.) These guidelines are typically not mandatory for non-listed species (e.g., special concern species) unless required by a permit, authorization or approval.

Northern Goshawks are protected by the Federal Migratory Bird Treaty Act of 1918, which established a prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703). Contact the US Fish and Wildlife Service directly for any permits related to the Federal Migratory Bird Treaty Act (see *Contact Information*).

If you have not yet read through Screening Procedures, please review them first to determine if avoidance measures are necessary for the project.

Avoidance can be attained by scheduling activities outside the normal Northern Goshawk breeding season: February 1 to July 31. The following are measures that were used for known or recently found Northern Goshawk nesting areas on state-managed properties. These *Avoidance Measures* were developed to give property managers a tool to use for forest management activities near Northern Goshawk nest areas. They have been evaluated through field monitoring, and appear suitable for protecting known nesting areas when all four are followed (Woodford 2009).

1. No-cut Area. In all forest types, establish a no-cut buffer around the active nest tree and any alternative nest trees; the area of no-cut depends on stand type, conifer density, topology, and distance to sale boundary. The recommended minimum no-cut radius is 660 feet around all nest trees. This distance provides a no-cut area of 31 acres for a territory with one nest tree. The no-cut buffer is designed to eliminate disturbance within the nest area and reduce the impact of weather on nesting birds. This reserve area also will reduce the likelihood of predation and interspecific competition from Red-tailed Hawks and Great Horned Owls. All these factors have been shown to negatively affect or eliminate nesting Northern Goshawks from established territories.

2. Residual Basal Area. In addition to the no-cut buffer, when uneven-age harvests or thinnings are prescribed, maintain a residual basal area higher than is typical for these types of harvests within the nest stand area (i.e., 1000 ft radius of the nest tree or center of nest area). At this time the best available information is to retain 70% of the nest area's pre-harvest basal area. For example, a stand with pre-harvest basal area of 140 ft^2/ac could be thinned to 98 ft^2/ac basal area. The nest area size (i.e., a 1000 ft radius circle) is the mean nest area size (approximately 72 acres) of known Northern Goshawk territories in Wisconsin and is similar to the nest area size reported in Northern Goshawk studies elsewhere (see Finn et al. 2002).

3. Breeding Season Disturbances. Limit activities that could disrupt Northern Goshawks (e.g., marking, harvesting, loading, hauling, and road/trail building activities) within the nest area (i.e., 1000 ft radius) to periods that minimize disturbance to adults and nestlings. Prohibit these activities from February 1 to July 31. (February 1 to May 31 is most critical.) This guideline will protect nesting Northern Goshawks that are most susceptible to human-caused disturbance during the breeding season. Significant disturbance over a prolonged period will likely cause failure of a breeding attempt and may result in complete territory abandonment by adults.

4. Limit Disturbances to One Year. Restrict timber harvesting, loading, hauling, and road/trail building within the nest area (i.e., 1000 ft radius of the nest tree) to one year during a timber sale. This guideline is intended to limit the duration of human disturbance near Northern Goshawk nests. Telemetry studies have shown that breeding pairs in Wisconsin do not migrate, but instead remain in the general area of their territory year round. Multiple years of disturbance in succession is likely to cause Northern Goshawks to abandon the nest area.

Strict adherence to all four of these *Avoidance Measures* will, in most cases, avoid any potential take of breeding adults, nestlings, and eggs. If these measures cannot be followed as prescribed, then contact the species expert (see *Contact Information*) to discuss other site-specific guidance.

Additional Information

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Linked Websites:

- All About Birds, Cornell Lab of Ornithology: <http://www.allaboutbirds.org/guide/Northern_Goshawk>
- Chequamegon National Forest Bird Survey (NRRI) species account: <http://www.nrri.umn.edu/mnbirds/accounts/NOGOa2.htm>
- E-bird (Wisconsin): <http://ebird.org/content/wi>
- Forest Birds of the Western Great Lakes: <http://www.nrri.umn.edu/mnbirds/>
- Forest Raptor Online Field Guide: <http://wiatri.net/inventory/Raptors/>
- Natural Communities of Wisconsin: <http://dnr.wi.gov, key word "natural communities">
- North American Breeding Bird Survey: http://www.mbr-pwrc.usgs.gov/bbs/bbs.html
- Rare Animal Field Report Form: http://dnr.wi.gov, key word "rare animal field report form">
- Wisconsin Breeding Bird Atlas: <http://www.uwgb.edu/birds/wbba/>
- Wisconsin All-Bird Conservation Plan, Wisconsin Bird Conservation Initiative: <http://www.wisconsinbirds.org/plan/species/nogo.htm>
- Wisconsin Initiative on Climate Change Impacts: <http://www.wicci.wisc.edu/>
- Wisconsin Endangered and Threatened Species: <http://dnr.wi.gov, key word "endangered resources">
- Wisconsin Natural Heritage Inventory Working List Key: <http://dnr.wi.gov, key word "Natural Heritage Working List">
- Wisconsin's Wildlife Action Plan: <http://dnr.wi.gov, key word "Wildlife Action Plan">

Funding

- Natural Resources Foundation of Wisconsin: <http://www.wisconservation.org/>
- USFWS State Wildlife Grants Program: <http://wsfrprograms.fws.gov/subpages/grantprograms/swg/swg.htm>
- Wisconsin Natural Heritage Conservation Fund
- Wisconsin DNR Division of Forestry

Contact Information (Wisconsin DNR Species Experts for Northern Goshawk)

- Jim Woodford, WI Department of Natural Resources, Bureau of Natural Heritage Conservation (715-365-8856, james.woodford@wisconsin.gov)
- WDNR district ecologist in your area

Contact Information (Federal Migratory Bird Treaty Permits or Questions)

- Larry Harrison, U.S. Fish and Wildlife Service, 5600 American Blvd. West, Suite 990, Bloomington, MN 55437-1458 (612-713-5489, Larry_Harrison@fws.gov)
  - See also <http://www.fws.gov/migratorybirds/mbpermits.html>

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